



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,826	07/22/2003	Ajit K. Chowdhury	780202.90083	6564

7590 06/08/2006

Bennett J. Berson  
Quarles & Brady LLP  
P.O. Box 2113  
Madison, WI 53701-2113

EXAMINER
----------

FIORITO, JAMES

ART UNIT	PAPER NUMBER
----------	--------------

1754

DATE MAILED: 06/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Applicati n N .

10/624,826

Applicant(s)

CHOWDHURY, AJIT K.

Examiner

James A. Fiorito

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 28-29 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: The relationship between the pore water and disrupting a CaSO<sub>4</sub> layer formed on the particulate matter in the contacting step to produce disrupted particulate matter; and contacting the disrupted particulate matter with the treatment solution.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-2, 5-6, 8-12, 14, 19-21, 23-24, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kigel '710 in view of Kohr '733.**

Kigel discloses a method for reducing mobile hexavalent chromium to non-leachable trivalent chromium in alkaline chromium-contaminated particulate matter or associated pore water, the method comprising the steps of: contacting a source of hexavalent chromium with ferrous ions to produce ferric ions; and contacting the

Art Unit: 1754

alkaline chromium-contaminated particulate matter or the pore water with the treatment solution for a time sufficient to convert ferrous sulfate into ferric sulfate and to reduce mobile hexavalent chromium to trivalent chromium in the particulate matter, wherein ferrous sulfate produced by oxidizing iron pyrite is a source of ferrous ions in the first contacting step (Column 1).

Kigel does not disclose a step of oxidizing iron pyrite with ferric ions to produce a treatment solution that comprises ferrous sulfate and sulfuric acid, and at least a portion of the ferric ions being obtained by microbiological catalytic oxidation of ferrous ions.

Kohr teaches a process with a step of oxidizing iron pyrite with ferric ions to produce a treatment solution that comprises ferrous sulfate and sulfuric acid, and at least a portion of the ferric ions being obtained by microbiological catalytic oxidation of ferrous ions (Column 7). Kigel and Kohr are analogous art because they are from the same field of endeavor, namely soil treatment process.

At the time of invention it would have been obvious to a person of ordinary skill in the art to form the chromium reduction process of Kigel to include the step of oxidizing iron pyrite with ferric ions to produce a treatment solution that comprises ferrous sulfate and sulfuric acid, and at least a portion of the ferric ions being obtained by microbiological catalytic oxidation of ferrous ions in view of the teaching of Kohr. The suggestion or motivation for doing so would have been to provide a means for the producing the ferrous sulfate and sulfuric acid required by Kigel (Column 1).

With respect to claim 6 and 10: It would have been obvious to add exogenous ferric salt to the iron pyrite, since the Kohr discloses that the equations governing the

Art Unit: 1754

oxidation of pyrite are equilibrium equations and adding exogenous ferric salt would produce more ferrous sulfate and sulfuric acid (Column 7).

With respect to claims 8-9 and 14: Kohr discloses that the oxidation of pyrite might occur both *in situ* or *ex situ* (Figure 1). Also according to the equations for pyrite oxidation water and oxygen are needed to facilitate the reaction (Column 7).

With respect to claims 19-21: Kigel teaches that adding silicates to the particulate matter when reducing hexavalent chromium to trivalent chromium assists in the immobilization and stabilization of the particulate matter (Abstract).

**Claims 3-4, 7, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kigel '710 in view of Kohr '733 as applied to claims 1-2, 5-6, 8-12, 14, 19-21, 23-24, and 27 above, and further in view of Japan 403060795.**

Kigel in view of Kohr does not expressly state that the source of hexavalent chromium is groundwater.

Japan '795 teaches a process of reducing hexavalent chromium in ground water to trivalent chromium with ferrous ions (Abstract). Kigel in view of Kohr are analogous art because they are from the same field of endeavor, namely chemical treatment process involving ferrous ions.

At the time of invention it would have been obvious to a person of ordinary skill in the art to form the chromium reduction process of Kigel in view of Kohr to include the step of reducing hexavalent chromium in ground water to trivalent chromium with ferrous ions in view of the teaching of Japan '795. The suggestion or motivation for

Art Unit: 1754

doing so would have been to provide a means for purifying wastewater containing hexavalent chromium (Title).

**Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kigel '710 in view of Kohr '733 as applied to claims 1-2, 5-6, 8-12, 14, 19-21, 23-24, and 27 above, and further in view of Elhaik '414.**

Kigel in view of Kohr does not expressly state that the iron-oxidizing bacterium is *Thiobacillus ferrooxidans*.

Elhaik '414 teaches a process of oxidizing pyrite with *Thiobacillus ferrooxidans* (Column 3-4). Kigel in view of Kohr and Elhaik are analogous art because they are from the same field of endeavor, namely chemical treatment process involving ferrous ions.

At the time of invention it would have been obvious to a person of ordinary skill in the art to form the chromium reduction process of Kigel in view of Kohr to include the iron-oxidizing bacterium is *Thiobacillus ferrooxidans* in view of the teaching of Elhaik '414. The suggestion or motivation for doing so would have been to provide a means for accelerating the oxidization of pyrite (Column 3-4).

**Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kigel '710 in view of Kohr '733 as applied to claims 1-2, 5-6, 8-12, 14, 19-21, 23-24, and 27 above, and further in view of Audeh '882 or Cole '696.**

Kigel in view of Kohr does not expressly state that the pyrite is oxidized with a chemical oxidant.

Art Unit: 1754

Cole teaches that hydrogen peroxide and organic peracids are known as accelerators of pyrite oxidation reactions (Column 4). Audeh teaches that hydrogen peroxide is a known oxidizer of pyrite (Column 6). Kigel in view of Kohr, Audeh and Cole are analogous art because they are from the same field of endeavor, namely chemical treatment process involving ferrous ions.

At the time of invention it would have been obvious to a person of ordinary skill in the art to form the chromium reduction process of Kigel in view of Kohr to include the pyrite is oxidized with a chemical oxidant such as hydrogen peroxide in view of the teaching of Audeh '882 or Cole '696. The suggestion or motivation for doing so would have been to provide a means for accelerating the oxidization of pyrite (Cole Column 4).

**Claims 25-26, and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kigel '710 in view of Kohr '733 as applied to claims 1-2, 5-6, 8-12, 14, 19-21, 23-24, and 27 above, and further in view of Furuya '099.**

Kigel discloses a step of grinding raw soil before treating it with ferrous sulfate (Column 5).

Kigel in view of Kohr does not expressly state the steps of: disrupting a  $\text{CaSO}_4$  layer formed on the particulate matter in the contacting step to produce disrupted particulate matter; and contacting the disrupted particulate matter with the treatment solution.

Furuya teaches disrupting a  $\text{CaSO}_4$  layer formed on a particulate matter in the contacting step to produce disrupted particulate matter; and contacting the disrupted

Art Unit: 1754

particulate matter with the treatment solution (Column 7-8). Kigel in view of Kohr, Furuya are analogous art because they are from the same field of endeavor, namely chemical treatment process involving calcium sulfate.

At the time of invention it would have been obvious to a person of ordinary skill in the art to form the chromium reduction the grinding step of Kigel in view of Kohr to include disrupting a  $\text{CaSO}_4$  layer formed on a particulate matter in the contacting step to produce disrupted particulate matter; and contacting the disrupted particulate matter with the treatment solution in view of the teaching of Furuya '099. The suggestion or motivation for doing so would have been to provide a means for treating the particulate inside the  $\text{CaSO}_4$  layer (Column 7-8).

### ***Double Patenting***

A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Claims 1-24 and 27 rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-22 of prior U.S. Patent No. 6,607,474. This is a double patenting rejection.



Art Unit: 1754

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Fiorito whose telephone number is (571)272-7426. The examiner can normally be reached on 9am - 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James Fiorito  
Patent Examiner  
AU 1754



Steven Bos  
Primary Patent Examiner  
AU 1754